ASSIGNMENT 1

Textbook Assignment: "Fundamentals of Data Communications," chapter 1, pages 1-1 through 1-13; "The Link-11 System," chapter 2, pages 2-1 through 2-8.

1-1. Which of the following are components of a communications system?

1. Receivers
2. Transmitters
3. Communications channels
4. All of the above

1-2. The conversion of da. to a form that can be sent over a communications channel is a fiction of which of the following communication system components?

1. The transmitting equipment
2. The receiving equipment
3. The communications channel
4. The computer

1-3. Data sent over a communications channel may be in which of the following forms?

1. Analog only
2. Digital only
3. Either analog or digital, depending on the type of system
4. Alphanumeric characters

1-4. A communications channel signal that varies continuously between a minimum and a maximum value is what type of signal?

1. Analog
2. Digital
3. Numeric quantities
4. Alpha characters

1-5. To convey data, analog signals can be varied in which of the following ways?

1. Phase only
2. Amplitude only
3. Frequency only
4. Phase, amplitude, or frequency

1-6. Which of the following communications signal types have a limited set of values and are transmitted as discrete pulses?

1. Analog
2. Digital
3. Both 1 and 2 above
4. Alphanumeric characters

1-7. In which of the following types of communications channels is data in a single direction ONLY?

1. Simplex
2. Duplex
3. Half duplex
4. Full duplex

1-8. Which of the following communications channels can transmit and receive data simultaneously?

1. Simplex
2. Duplex
3. Half duplex
4. Full duplex

1-9. Which of the following types of communications channels transmits data in one direction, pauses, and then receives data coming in the opposite direction?

1. Simplex
2. Duplex
3. Half duplex
4. Full duplex

1-10. What device converts digital data signals to tones and converts tones back to digital data signals?

1. Modem
2. Modulator
3. Demodulator
4. Data converter

1-11. The modulator of a modem performs which of the following functions?

1. It converts data to be transmitted into discrete modifications of the tone or carrier signal
2. It converts data-carrying tones into digital data
3. It receives digital data from the demodulator
4. It receives analog data from the computer

1-12. The operational characteristics of a radio communications system are determined by what means?

1. Low frequency
2. High frequency
3. Carrier frequency
4. Radio frequency band

1-13. The tactical digital information links that the Navy uses generally require which of the following radio frequency bands?

1. LF
2. HF
3. UHF
4. Both 2 and 3 above

1-14. The data signals must be ____(a)____ to the carrier signal at the transmitter and ____(b)____ from the carrier signal in the receiver.

1. (a) Modulated (b) modulated
2. (a) Modulated (b) demodulated
3. (a) Demodulated (b) modulated
4. (a) Demodulated (b) demodulated

1-15. A radio frequency of 8,090 KHz is in which of the following frequency bands?

1. LF
2. MF
3. HF
4. UHF

1-16. Which of the following radio frequency bands is limited to line-of-sight communications?

1. LF
2. MF
3. HF
4. UHF

1-17. Decibels are the unit of measure of what function of an amplifier, communications equipment, or a system?

1. Gain
2. Power
3. Output
4. Input

1-18. The bel most often expresses what value of any component, circuit, or system?

1. Power
2. Input
3. Output
4. Ratio of input to output power

1-19. In the formula for bel, which of the following symbols would represent the output of an amplifier?

1. N
2. PI
3. P2
4. Log10

1-20. In the formula for bel, which of the following symbols would represent the gain of an amplifier in bels?

1. N
2. P1
3. P2
4. Log_{10}

1-21. The decibel is equal to what total number of bels?

1. 1/10 bel
2. 1/100 bel
3. 1 bel
4. 10 bels

1-22. A value of 1.5 bels is equal to what total number of decibels?

1. 1.5
2. 15
3. 150
4. 1,500

1-23. What is the power ratio of an increase of a reference signal of 30 dBs?

1. 10
2. 100
3. 1,000
4. 10,000

1-24. A power gain of -6 dB from a reference signal of 1,000 watts results in what maximum value of output signal?

1. 250 watts
2. 500 watts
3. 2,500 watts
4. 5,000 watts

1-25. When dBm is measured, which of the following signals is normally the reference signal?

1. Input
2. Output
3. 1 milliwatt
4. 1 millivolt

1-26. Which of the following signal levels indicates that the output signal is greater than the input signal?

1. 5 dB
2. +3 dB
3. Either 1 or 2 above
4. -2 dB

1-27. A reading of 0 dB indicates that the output signal has what relationship to the reference signal?

1. Equal to
2. Less than
3. Greater than
4. Not equal to

1-28. A reading of 0 dBm indicates an output value equal to which of the following signal values?

1. 0 dB
2. 1 milliwatt
3. 500 watts
4. 1,000 watts

1-29. What framed transmission method is used to transmit ASCII characters?

1. Asynchronous
2. Synchronous
3. Message framed
4. Alphanumeric framed

1-30. What framed transmission method is used to transmit long streams of uninterrupted data bits?

1. Asynchronous
2. Synchronous
3. Character framed
4. Alphanumeric framed

1-31. When the asynchronous transmission method is used, each character sent has which of the following control bits?

1. Start bit(s) only
2. Stop bit(s) only
3. Both start and stop bits
4. Parity bits

1-32. When the asynchronous transmission method is used, synchronization between the transmitting and the receiving devices is achieved by which of the following methods?

1. Synchronization reference signal in the preamble
2. Synchronization reference in the stop codes
3. Character-by-character synchronization
4. External timing signals sent concurrently on a separate line

1-33. Which of the following codes indicates the beginning sequence of a synchronous message?

1. Sync bits
2. Stop code
3. Parity code
4. Preamble

IN ANSWERING QUESTIONS 1-34 THROUGH 1-38. MATCH THE TERM OR STATEMENT IN COLUMN A WITH THE BASIC MODE OF MODULATION LISTED IN COLUMN B. RESPONSES IN COLUMN B MAY BE USED MORE THAN ONCE.

	A. TERMS/ STATEMENT	B. MODES
1-34.	The change in signal amplitude indicates a change in the 1 or 0 bits being transmitted	1. Phase modulation 2. Amplitude modulation 3. Frequency modulation
1-35.	Differential quadrature phase-shift keying	

1-36. BFSK

1-37. AFTS

1-38. Interrupting the cycle at a degree point and changing the direction or amplitude of the sine wave

1-39. Which of the following modes of modulation can be used to modify carrier signals to convey data?

1. Phase modulation
2. Frequency modulation
3. Amplitude modulation
4. All of the above

1-40. In which of the following modulation methods are frequencies above and below a center frequency used to indicate a logic 1 or 0 bit?

1. Amplitude modulation
2. Frequency-shift keying
3. Audio frequency tone shift
4. Differential quadratic phase-shift keying

1-41. Which of the following modulation methods uses two discrete audio tones that are modulated to a constant frequency carrier signal?

1. FSK
2. BFSK
3. AFTS
4. Phase-shift keying

1-42. When quadrature phase-shift modulation is used, a single tone transmits what total number of binary bits of data for each phase Shift?

1. One
2. Two
3. Three
4. Four

1-43. When quadrature phase-shift modulation is used, which of the following phase shifts indicates a binary 00?

1. +135 degrees
2. –135 degrees
3. +225 degrees
4. –225 degrees

1-44. Which of the following components of a modem converts the data bits into a carrier signal?

1. The transmitter
2. The receiver
3. Both 1 and 2 above

1-45. Each modem transmitter circuit outputs several carrier signals.

1. True
2. False

1-46. Which of the following circuits allows ONLY the desired carrier signal to be received from the communications channel?

1. The demodulator
2. The data decoder
3. The band pass falter
4. The receiver control circuit

1-47. The term baud describes the number of characters per second transmitted over a communications channel.

1. True
2. False

1-48. Multiplexing data being transmitted over a communications channel performs which of the following functions?

1. It increases the baud rate
2. It allows multiple users of the same channel
3. Either 1 and 2 above
4. It changes the carrier frequency

1-49. Which of the following multiplexing methods divide(s) the asynchronous message into a fixed number of time slots?

1. Time division
2. Frequency division
3. Both 1 and 2 above
4. Quadrature phase-shift

1-50. Which of the following multiplexing methods transmits several tones over a single communications channel?

1. Time division
2. Frequency division
3. Both 1 and 2 above
4. Quadrature phase-shift

1-51. Link-11 is designated as which of the following types of tactical data information link?

1. TADIL A
2. TADIL C
3. TADIL J
4. Teletype

1-52. Link-11 communications can operate with which of the following radios?

1. HF only
2. UHF only
3. Either HF or UHF
4. VHF only

1-53. When Link-11 is operated with UHF radio, it is capable of over-the-horizon communications.

1. True
2. False

IN ANSWERING QUESTIONS 1-54 THROUGH 1-61, SELECT FROM THE FOLLOWING LIST THE EQUIPMENT THAT PERFORMS THE FUNCTION DESCRIBED IN THE QUESTION. ITEMS IN THE LIST MAY BE USED MORE THAN ONCE.

A. CDS Digital Computer
B. SGS Computer
C. Cryptographic Device
D. Data Terminal Set
E. Communications Switchboard
F. Radio Set

1-54. Selects the HF or the UHF transceiver.

1. B
2. C
3. D
4. E

1-55. Encrypts parallel data from the CDS computer and passes the encrypted data to the data terminal set.

1. A
2. B
3. C
4. D

1-56. Correlates reported positions of local and remote tracks.

1. A
2. B
3. C
4. D

1-57. Outputs 24-bit data words to the security equipment via the SGS computer.

1. A
2. B
3. C
4. D

1-58. Multiplexes and modulates parallel data into audio tones.

1. A
2. B
3. C
4. D

1-59. Receives the audio tone package from the data terminal set and transmits the tones.

1. C
2. D
3. E
4. F

1-60. Demodulates the audio tones and checks the six hamming bits for transmission errors.

1. A
2. B
3. C
4. D

1-61. Decrypts the 24-bit data word and sends it to the CDS computer.

1. A
2. B
3. C
4. D

1-62. Which of the following functions is performed by an antenna coupler?

1. Amplification of the HF radio signal
2. Impedance matching of the antenna and the radio set
3. Conversion of atmospheric electromagnetic energy to RF current
4. Coupling of the data terminal set to the radio

1-63. The size of an antenna is determined by which of the following factors?

1. The operating power
2. The operating frequency
3. The range of the receiver
4. The type of data being transmitted

1-64. The frequency range of an antenna can be extended by adding which of the following factors?

1. A resistive load only
2. A capacitive load only
3. An inductive load only
4. Either a capacitive or an inductive load

1-65. Which of the following functions is NOT performed by the data terminal set?

1. Generating the radio key-line signal
2. Converting digital data to audio tones
3. Encrypting CDS computer data
4. Converting audio tones to digital data

1-66. The data terminal set communicates with the radio set via which of the following devices?

1. The communications switchboard
2. An antenna coupler
3. The cryptographic device
4. The SGS computer

1-67. Which of the following radio frequency modulation methods is used to minimize propagation-caused signal loss during HF Link-11 operations?

1. Quadrature phase-shift modulation
2. Frequency modulation
3. Phase modulation
4. Amplitude modulation independent sideband

1-68. Which of the following individuals is responsible for assigning primary and secondary Link-11 frequencies before the deployment of a task force?

1. The aircraft carrier commanding officer
2. The net control station track supervisor
3. The task force commander
4. The fleet CinC

1-69. When a Link-11 net is established, which of the following sequences of operations should be followed to determine readiness of all units to enter the net?

1. Net Test, Net Sync, roll call
2. Net Sync, Net Test, roll call
3. Net Sync, Net Test, Broadcast
4. Roll call, Net Test, Net Sync

IN ANSWERING QUESTIONS 1-70 THROUGH 1-75, SELECT FROM THE FOLLOWING LIST THE OPERATING MODE DESCRIBED IN THE QUESTION.

A. Net Synchronization
B. Net Test
C. Roll Call
D. Broadcast
E. Short Broadcast
F. Radio Silence

1-70. What Link-11 operating mode establishes a uniform time base from which all net communications are normally initiated?

1. A
2. B
3. C
4. D

1-71. In what Link-11 operating mode is each picket unit interrogated, in turn, by NCS?

1. A
2. B
3. C
4. D

1-72. What Link-11 operating mode provides an overall evaluation of net and equipment performance?

1. B
2. C
3. D
4. E

1-73. In what Link-11 operating mode will one participating unit transmit data continuously to all other net members?

1. C
2. D
3. E
4. F

1-74. In what Link-11 operating mode are the radio set key line and data terminal audio output inhibited?

1. C
2. D
3. E
4. F

1-75. In what Link-11 operating mode is a single data transmission sent only when the operator depresses the TRANSMIT START button?

1. B
2. C
3. D
4. E